

TECHNICAL SPECIFICATIONS

ITEM 5

STREETS, WALKS, AND DRIVEWAYS

1. General: This item includes the construction of all street, curb and gutter, sidewalk, and driveway construction within public right-of-way. It does not include walk and driveway construction beyond the right-of-way property line. The provisions of these specifications are intended to apply primarily to new developments and to new streets within existing platted or annexed areas, and the developer shall provide complete plans, including profiles, of the proposed work for approval prior to initiating any work in the area. Street design shall conform to the requirements of the current Subdivision Ordinance and to these technical specifications. All streets shall have curb and gutter and bituminous surfacing, and all street construction shall conform to the requirements of this item of the Standard Specifications.
2. Street Classification and Pavement Structure Requirements:
 - A. All streets shall be classified as either Residential (local, minor, and major), Collector (minor or major), or Others. The classifications shall be as specified in the criteria found in the Subdivision Ordinance and/or as approved by the City. "Others" shall refer to streets shown by the City, City Engineer, or a Registered Professional Engineer, based on acceptable engineering practices, that loading or traffic count requirements exceed those provided for the street classifications.
 - (1) Residential

ROW	- See Subdivision Ordinance
Asphaltic Surface	- 1 1/2" hot-mix asphaltic concrete
Flexible Base	- See Pavement Thickness Design Chart
Pavement Width	- See Subdivision Ordinance
 - (2) Collector

ROW	- See Subdivision Ordinance
Asphaltic Surface	- 2" hot-mix asphaltic concrete
Flexible Base	- See Pavement Thickness Design Chart
Pavement Width	- See Subdivision Ordinance
 - (3) Other

ROW	- As approved by City
Asphaltic Surface	- 2" hot-mix asphaltic concrete
Flexible Base	- See Pavement Thickness Design Chart

Pavement Width
Axle Frequency
Loading

- As approved by City

- Number of 18,000 pound equivalent axle load repetitions which street will experience if its design life exceeds 150,000.

3. Alignment and Grades:

- A. Alignment: Street and curb alignment shall consist of uniform straight line tangents connected by true circular horizontal curves. Compound curves may be used where necessary to achieve the desired alignment. Extensions of existing streets shall match the existing street centerline without abrupt offsets, and any widening shall be accomplished equally on both sides with horizontal curves in the curb line. Requirements of the current Subdivision Ordinance shall also be complied with in establishing the street alignment. At intersections, curbs shall have a minimum radius of fifteen (15) feet to the back of the curb. Larger radii at these points are permissible if desired. Curb returns at driveway approaches shall have five (5) foot radius to the back of the curb.
- B. Grades: Streets and curbs shall be on uniform straight line grades with any changes of grade made on a true calculated parabolic vertical curve. Abrupt changes of grade without vertical curves will not be permitted. Vertical curves may be successive without an intervening tangent grade where necessary, but shall not be compounded. Uniform grades shall not be less than zero point thirty (0.30) percent and shall not exceed ten (10) percent without approval. Grades for sidewalks shall be exactly that of the curb which is adjacent. Elevations for sidewalks shall be one (1) inch above the elevation of the adjacent curb, with the sidewalk also having a fall of one quarter (1/4) inch per foot toward the street. Valley gutters shall have a minimum of zero point thirty (0.30) percent grade truly uniform.
- C. Standard Details: All streets, curb and gutter, sidewalks, and driveways shall conform to the standard plans and details appended to these Standard Specifications.
- D. Construction Tolerances: Maximum allowable deviations from alignments and grades shown on the plans shall be:
- (1) Alignment: Variations from the true alignment shall not exceed zero point zero five (0.05) feet combined amount in any one hundred (100) foot distance.
 - (2) Grade:
 - (a) Subgrade - + 0.05 feet
 - (b) Finished Base Course - + 0.03 feet without abrupt changes.
 - (c) Finished Pavement Surface - + 0.02 feet
 - (d) Curbs - For grades of:
 - Over 1.0% - 0.02 ft.
 - 0.5 to 1.0% - 0.01 ft.
 - Under 0.5% - 0.00

Regardless of the allowable tolerances indicated for curbs, all curb and gutter shall be constructed to proper grade to drain freely and any gutter constructed with water pockets shall be torn out and properly replaced at the Contractor's expense.

Any variation in alignments, grades, plans or sections as herein required shall only be by written consent of the City Engineer.

4. Quality Control: Attention is invited to the Quality Control provisions of the General Provisions of these Standard Specifications. All work under this item will be subject to these quality control requirements.
5. Materials: Materials for the various features of work under this item of these specifications shall meet the following requirements:
 - A. Concrete shall conform to the requirements of Item 2, Concrete.
 - B. Lime for subgrade stabilization shall conform to the requirements of Item 264 of the Texas Highway Department Standard Specifications, for Type A or Type B.
 - C. Flexible Base Material shall be obtained from approved sources and shall be crushed limestone consisting of durable particles mixed with approved binding materials. The material shall be subject to approval of the City Engineer at the source. The processed material when properly slaked and tested by standard laboratory methods shall meet the following requirements:

Retained on 1 3/4 inch sieve . . 0%
Retained on No. 4 sieve 45 to 75%
Retained on No. 40 sieve 60 to 85%

The material when tested by "The Wet Ball Method for Determining the Disintegration of Flexible Base Materials" according to the latest procedures of the Texas Highway Department shall not develop more than fifty (50) percent soil binder prior to rolling.

Materials passing the No. 4 sieve shall be known as "Binder". The portion of material passing the No. 40 sieve shall be known as "Soil Binder" and shall meet the following requirements:

The liquid limit shall not exceed 40 when tested in accordance with AASHO designation T89-49.

The plastic limit shall be determined by testing in accordance with AASHO designation T90-49.

The plasticity index shall not exceed 12 or be less than 4 when calculated in accordance with AASHO designation T91-49.

The preparation of samples for testing according to AASHO designations T89-49, T90-49, and T91-49 shall be according to AASHO designation T146-49 "Wet Preparation of Disturbed Soil Samples for Test".

Materials retained on the No. 4 sieve shall have a per cent wear of not more than 45 when tested according to AASHTO designation T96-49 "Abrasion of Coarse Aggregate by use of the Los Angeles Abrasion Machine".

- D. Bituminous Materials: All bituminous materials shall conform to the Texas Highway Department Standard Specification Item 300, types and grades as indicated below:

Tack Coat	- RC-2, or a slow or medium setting emulsion.
Prime Coat	- MC-30 or MC-70
Asphalt for Hot-Mix	
Asphaltic Concrete	- AC-10
Asphalt for 2-Course	
Surface Treatment	- AC-3 or AC-5

- E. Paving Mixes and Aggregates shall conform to the Standard Specification items of the Texas Highway Department as listed below:

Hot Mix Asphaltic Concrete	- Item 340, Type "D"
Aggregate for Surface Treatment	- Item 302, Type B, Grade 3 for first course and Grade 4 for second course.

- F. Where more than one (1) type or grade of material is given, the City Engineer shall determine the type of grade to be used for the project.

6. Excavation, Fill, and Grading: All excavation, construction of fills or embankments and grading within the public right-of-way shall conform to the following requirements. All completed work shall conform to the plans and applicable Standard Details and shall be accomplished as specified hereinafter.

- A. Excavation shall be in accordance with the lines, grades, and typical sections as shown on the plans or established by the Engineer. Unless otherwise shown on the plans or established by the Engineer, street excavation will be made to the subgrade.

- B. Embankments (Fills): Prior to placing fill material, the area on which the fill is to be placed shall be cleared of all trees, brush, stumps, and other obstructions.

Embankments shall be constructed of suitable materials approved by the Engineer and shall be placed in successive horizontal layers of not more than eight (8) inches in depth, loose measurement, for the full width of the embankment and in such lengths as designated. Stumps, trees, rubbish, vegetation or other unsuitable materials shall not be placed in embankments. All construction traffic shall be uniformly distributed over the entire surface of each layer of the embankment.

A "Maintainer", or a "Blade Grader" weighing at least three (3) tons, with a blade at least ten (10) feet in length shall be kept in operation on the embankment for the purpose of uniformly mixing, spreading, pulverizing, and consolidating the embankment material.

After a layer of embankment material has been placed and bladed, it shall be sprinkled, if directed, in the quantity as determined by the Engineer, and rolled-to-compaction with a

tamping roller, of approved type.

Embankment placed over and adjacent to pipes, culverts, and other structures shall be of suitable materials, and shall be placed in successive horizontal layers of not more than eight (8) inches in depth, loose measurement, and each layer uniformly mixed, pulverized and thoroughly compacted to the satisfaction of the Engineer, by the use of rakes, hand tamps, and/or other approved methods.

Special care shall be taken to prevent any wedging action against the structure. This method of consolidation and compaction shall be used for such distances along embankment adjacent to structures as may be necessary and in other areas where blading and rolling would be impractical.

Where a large portion of the materials excavated consist of rock, the rock may be used in the construction of the embankment as hereinafter specified.

The maximum dimension of any rock used shall not exceed fifty (50) percent of the height of the embankment and in no case shall any rock over twenty-four (24) inches in its maximum dimension be placed in the embankment. When the greater portion of the embankment is to compose of materials other than rock, the embankment shall be constructed as required in the preceeding paragraphs, and the rock shall be carefully distributed throughout the embankments and filled around with earth or other approved fine material so that the interstices between the large particles are filled and a dense, compacted, uniform embankment is secured.

The upper eight (8) inches of all embankments shall be composed of soil without objectionable quantities of rock.

All embankments shall be compacted for the full depth to a density of ninety (90) percent of maximum density as determined by the modified Proctor method, ASTM Designation D1557.

7. Provisions for Drainage: If it is necessary in the prosecution of the work to interrupt the natural drainage of the surface, or the flow of artificial drains the Contractor shall provide temporary drainage facilities that will prevent damage to public or private interests, and shall restore the original drains as soon as the work will permit. The Contractor shall be held liable for all damages which may result from neglect to provide for either natural or artificial drainage which his work may have interrupted.

If excavation of road materials indicates seepage of ground water into the area under the road bed subsurface drainage as approved by the City Engineer shall be installed.

If permanent underground drainage facilities or off-street drainage facilities are required, they shall conform to Item 6, Drainage Facilities, of these Standard Specifications.

8. Subgrade Sampling Procedure:

- A. Samples shall be obtained of the predominant subgrade materials from the street right-of-way.

- B. Sampling locations shall be selected at intervals not to exceed three hundred (300) feet.
- C. Each sample shall consist of approximately two (2) pounds of material and should be properly identified as to sampling location and sampling depth interval.
- D. The sample shall be representative of the twelve (12) inches below subgrade elevation. It should be cautioned that the top twelve (12) inches of the natural soil profile is not necessarily representative of the subgrade.
- E. Notations shall be made of any fill areas, soft ground conditions, groundwater, or other unusual situations which may influence the pavement design. Sampling should not be from previously backfilled trenches.

9. Laboratory Testing Procedure:

- A. All samples of subgrade materials shall be visually examined in the laboratory for the initial soil classification and color description.
- B. Samples which visually appear to be similar shall be grouped together. This process is very important since subsequent testing is performed on these grouped samples.
- C. Representative samples from each of these groups shall be tested for the following properties:
 - Liquid Limit (LL)
 - Plastic Limit (PL)
 - Plasticity Index (PI)
 - Percentage Passing No. 200 Mesh Sieve
 - Optimum Moisture Content
 - Modified Proctor Density
- D. All samples shall be stored until the project is complete. These samples may be useful during construction as an aid in identifying the various subgrade groups.

10. Subgrade Group Classification Procedure:

- A. Plot the results of the Atterberg Limits tests (LL and PI) on the "Subgrade Classification Chart", Table II, to obtain the subgrade group.
- B. The resulting subgrade group may be up-graded one (1) group if less than forty (40) percent of the material passes the No. 200 mesh sieve. This applies only to groups III through VII.

11. Pavement Thickness Design Procedure:

- A. Each street must be assigned one of the traffic classifications as indicated below:

Residential Street	(local, minor, and major)
Collector Street	(minor and major)
Others	(approved by City)

The City Engineering Department must be consulted to aid in these traffic classifications.

- B. The appropriate "Pavement Thickness Design Chart" (see Tables III through V) selected on the basis of the traffic classification can then be used with the subgrade classification group to determine the total required pavement thickness.
- C. The pavement section will consist of hot-mix asphaltic concrete surface (thickness as indicated on "Pavement Thickness Design Chart") overlying a crushed limestone base material.
- D. For pavements designed for subgrade groups IV through VII, a select sub-base layer may be substituted for a portion of the base layer. The select sub-base material must be classified using the subgrade classification procedure and a subgrade group assigned to the sub-base material. The pavement thickness required above the sub-base material is determined using the design charts and the group classification.
- E. A six (6) inch thickness of lime-stabilized subgrade may be substituted for eight (8) inches of crushed limestone base material for pavements designed in subgrade groups IV through VII. The quantity of hydrated lime may be selected from the table below:

<u>Subgrade Group No.</u>	<u>Pounds of Lime to be Applied per Square Yard: Six (6) inch Compacted Thickness</u>
IV	20 pounds per square yard
V	22 pounds per square yard
VI	25 pounds per square yard
VII	28 pounds per square yard

TABLE I
CITY OF COPPERAS COVE
FLEXIBLE PAVEMENT DESIGN PROCEDURE
SUBGRADE CLASSIFICATION GROUPS

Soil Classification Tests

<u>Group No.</u>	<u>Liquid Limit</u>	<u>Plasticity Index</u>	<u>Typical Material Description</u>
I	< 35	5-15	limestone, weathered limestone, or severely weathered limestone
II	30-40	10-25	sandy clays, silty clays, or severely weathered limestone
III	40-50	15-30	sandy clays, silty clays, or severely weathered limestone
IV	50-60	20-35	clay or silty clay
V	60-70	25-40	clay
VI	70-80	35-50	clay
VII	> 80	40-60	clay

Graphical representation of these subgrade groups are shown on following Table II. Values which plot on the borderline between two (2) groups should be assigned the group number of the poorer soil group. Soils which have less than forty (40) percent passing the No. 200 mesh sieve and which would plot in Groups III through VII may be up-graded to the next better group.

TABLE II
CITY OF COPPERAS COVE
PAVEMENT DESIGN PROCEDURE
SUBGRADE CLASSIFICATION CHART

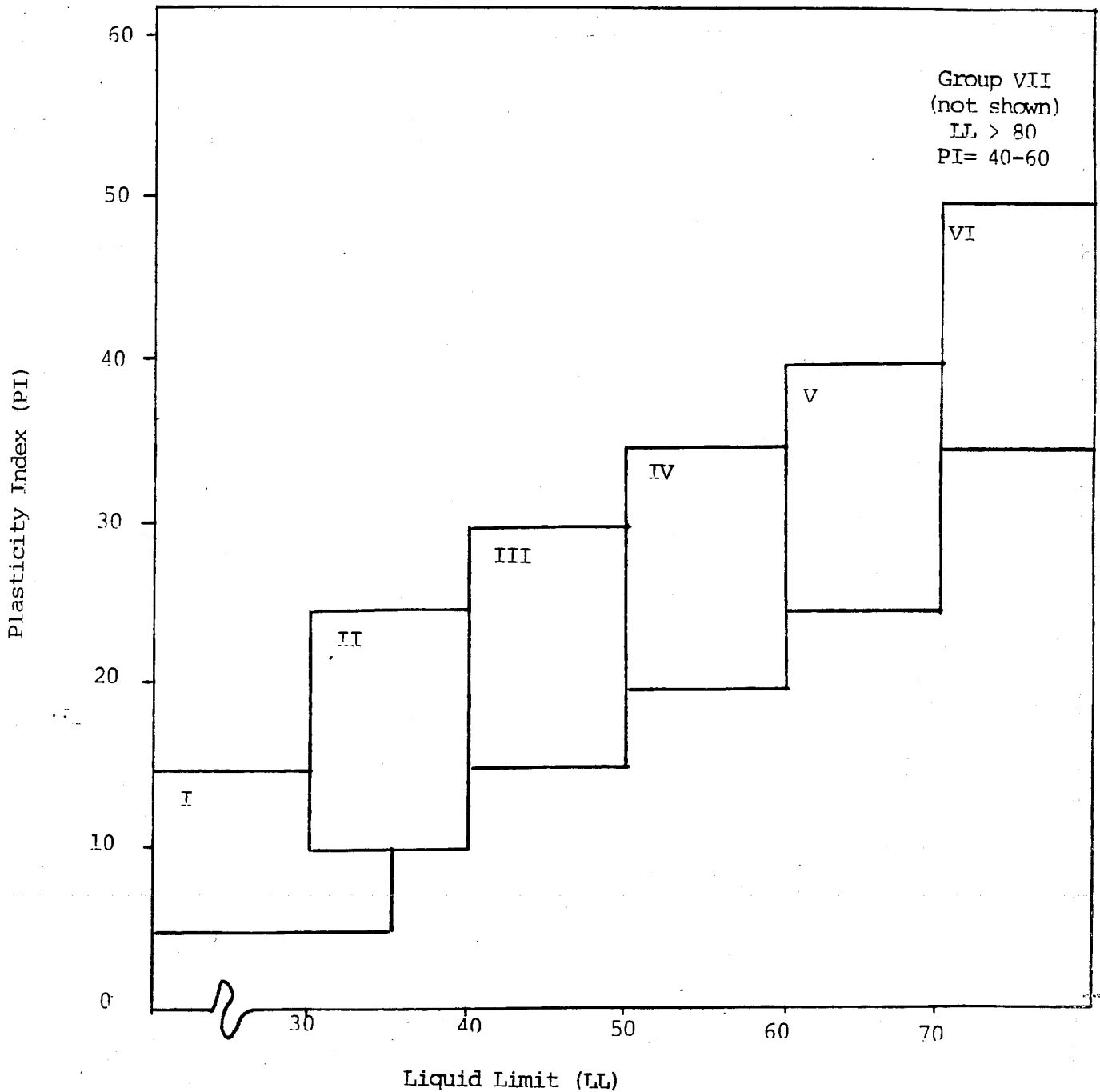


TABLE III

CITY OF COPPERAS COVE

PAVEMENT THICKNESS DESIGN CHART

LOCAL, MINOR, and MAJOR RESIDENTIAL STREET

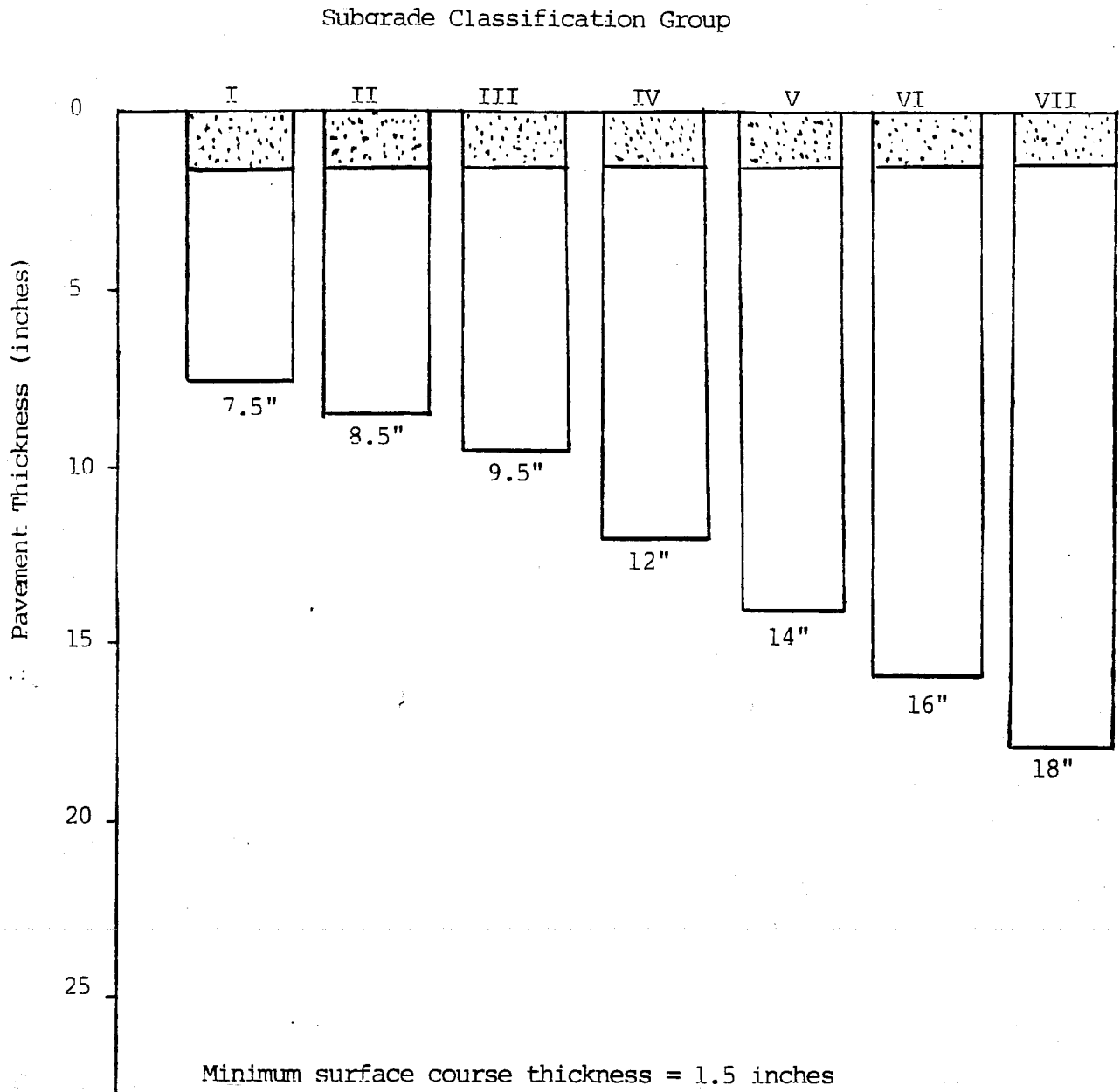


TABLE IV

CITY OF COPPERAS COVE

PAVEMENT THICKNESS DESIGN CHART

MINOR and MAJOR COLLECTOR STREET

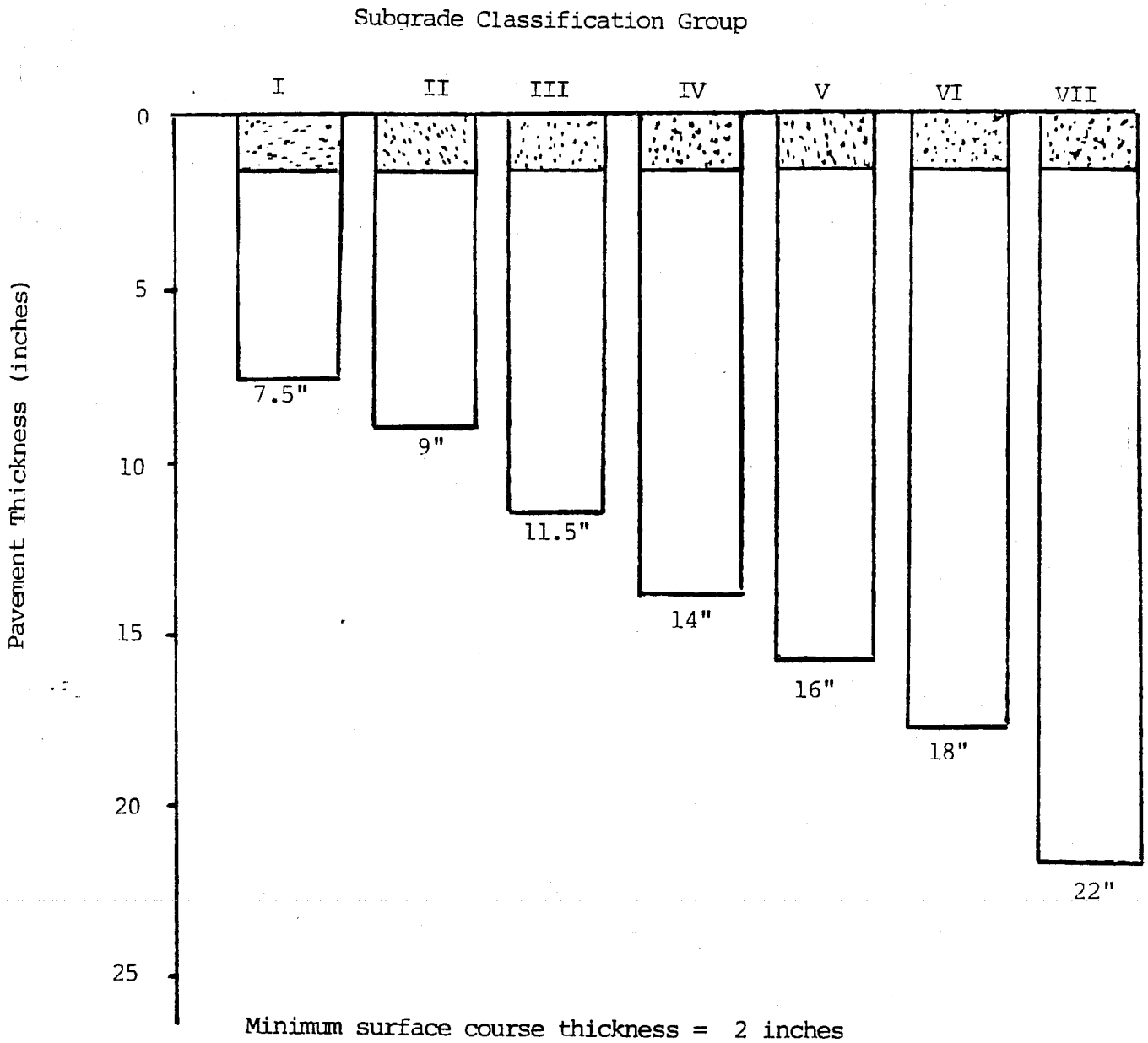
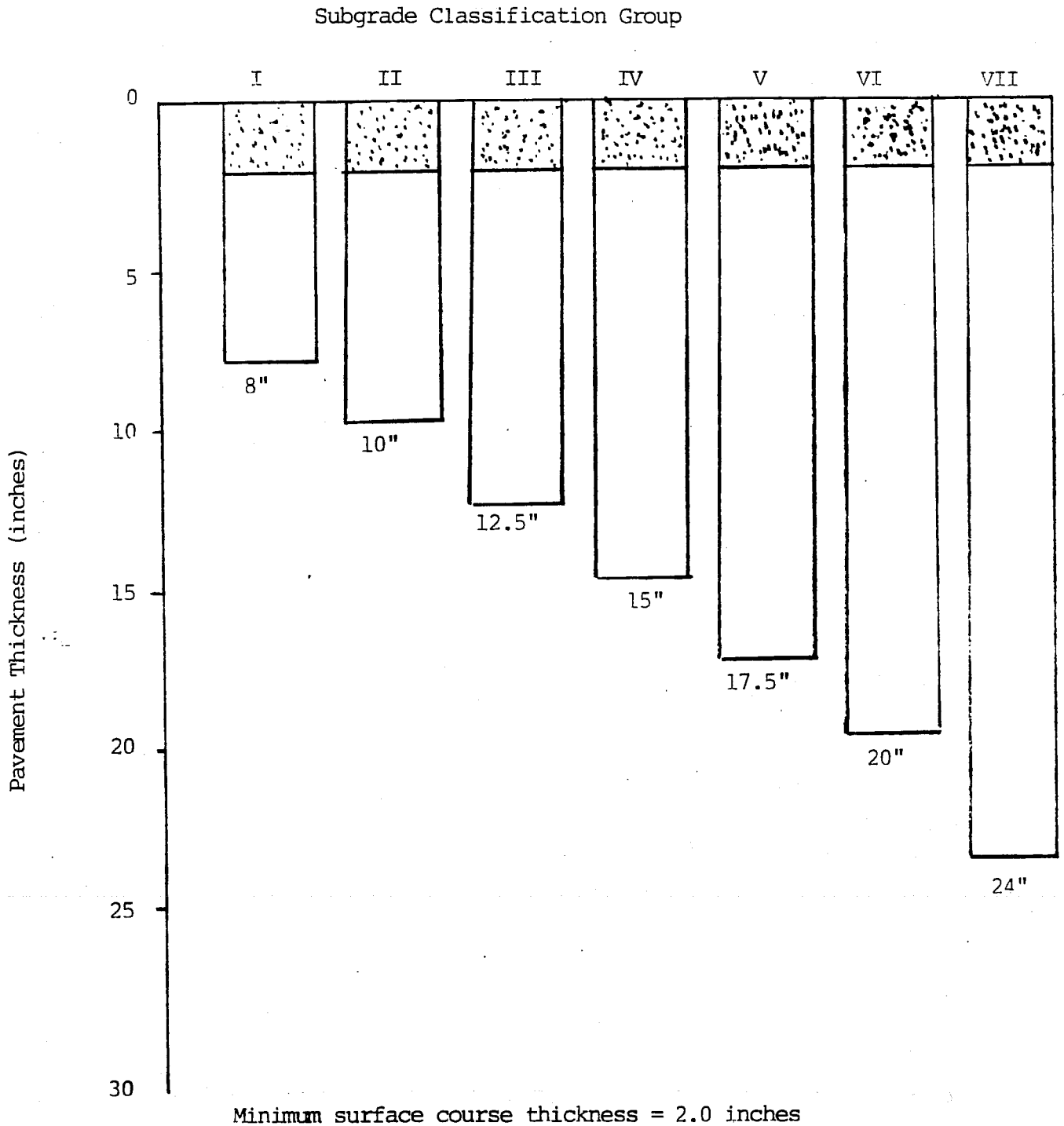


TABLE V

CITY OF COPPERAS COVE

PAVEMENT THICKNESS DESIGN CHART

OTHER STREETS



12. Subgrade Preparation:

- A. If subgrade consists of fill material or natural, non-lime-stabilized material the top six (6) inches shall be compacted as required to ninety-five (95) percent modified Proctor Density.
- B. Lime Stabilized Subgrade should be constructed in accordance with Texas Highway Department Item 260, Lime Treatment for Materials In-Place using the quantity of hydrated lime required by the design procedure. Hydrated lime should meet the requirements of Texas Highway Department Item 264. The well-mixed and cured soil-lime mixture should be compacted to a minimum of ninety-five (95) percent of ASTM D1557 maximum density at optimum moisture content.

Approved lime-stabilization procedures follow.

The existing subgrade shall be pulverized to a depth of six (6) inches and shall be treated with lime and water either in the form of a slurry or the materials may be applied to the subgrade separately.

The lime and moisture are to be uniformly mixed with the subgrade by the use of an approved pulvi-mixer. The section will then be brought to proper crown and grade. In the event that all clods and lumps are not sufficiently broken up by the pulvi-mixer, the soil-lime mixture shall be allowed to cure from two (2) to four (4) days as directed by the City Engineer. During the curing period, the material shall be kept moist as directed. After the curing is completed, the final mixing shall begin. The mixture (exclusive of all plus half (1/2) inch non-slaking aggregates) when properly mixed shall meet the following requirements when dry screened on a dry weight basis.

Passing 2" Screen	100%
Passing 1/2" Screen, Minimum	60%

Water shall be added during the mixing of soil and lime to attain the optimum moisture content to ninety-five (95) percent maximum density as determined by the modified Proctor method, ASTM Designation D1557.

After compaction is completed, the surface shall be shaped, water added as needed and finish rolled as directed with a pneumatic or other suitable roller sufficiently light to prevent cracking.

The completed section shall be moist cured until such time as the first course of base material is placed and compacted.

13. Flexible Base Course: Prior to placing the flexible base material on the subgrade, the surface of the subgrade shall be bladed and rolled, as necessary and to the extent directed in order to place the subgrade in an acceptable condition to receive the base material. The surface of the subgrade shall be smooth and conform to line and grade as established and in conformity with the typical section as shown on the plans. Sufficient subgrade shall be prepared in advance to insure satisfactory prosecution of the work.

Where the base course exceeds six (6) inches in thickness, it shall be constructed in two (2) or more courses of equal thickness as indicated on the typical section.

Immediately before placing the base course material, the subgrade shall be checked as to conformity with grade and section. The surface of the subgrade shall not show deviations in excess on one quarter (1/4) inch of five (5) feet, nor one-half (1/2) inch in sixteen (16) feet longitudinally.

The base course material shall be delivered in approved vehicles of a uniform capacity, and the required amount of specified material shall be delivered to secure the proper thickness of completed base course. Material deposited on the subgrade shall be spread and shaped the same day. All material shall be moved at least once from the original position in which it is deposited. The material shall be sprinkled, if directed, and shall then be bladed and shaped to conform to the typical section as shown on the plans. All areas and "nests" of segregated coarse or fine material shall be corrected or removed and replaced with well graded material as directed by the Engineer. If additional binder is considered desirable or necessary after the material is spread and shaped, it shall be furnished and applied in the amount directed by the Engineer. Such binder shall be carefully incorporated with the other approved methods. The course shall be sprinkled as required and compacted to the extent necessary to provide not less than the percent density as hereinafter specified. After each section of flexible base is completed, tests as necessary will be made. If the material fails to meet the density requirements, it shall be reworked as necessary to meet these requirements. Throughout this entire operation, the shape of the course shall be maintained by blading, and the surface upon completion shall be smooth and in conformity with typical sections shown on the plans and to the established lines and grades. On the surface where pavement is to be placed, any deviation in excess of one-fourth (1/4) inch in cross-section and in length of sixteen (16) feet measured longitudinally shall be corrected by loosening, adding or removing material, reshaping and recompacting by sprinkling and rolling. All irregularities, depressions or weak spots which develop shall be corrected immediately by scarifying the areas affected, adding suitable material as required, reshaping and recompacting by sprinkling and rolling.

The base material shall be compacted at optimum moisture content to ninety-five (95) percent modified Proctor Density as determined by ASTM Designation D1557.

14. Bituminous Surfaces: All streets shall have a surface treatment of Hot Mix Asphaltic Concrete (HMAC) of the minimum thickness shown on the Standard Details, or, when approved in writing by the City Engineer, a two (2) course penetration type asphalt surface treatment may be applied. If the two (2) course penetration pavement is used, the thickness of the flexible base course must be increased by at least the difference in thickness between the HMAC surface course and the two (2) course penetration pavement in order to provide a combined total thickness of base course and surface treatment equal to or greater than the combined total thickness of the base course and HMAC pavement shown on the Standard Details or otherwise required.

A. Construction of HMAC Pavement: Prime coat, tack coat, and HMAC surface course or courses shall be placed in accordance with the following:

- (1) Prime Coat: All base courses to receive asphaltic concrete pavement shall be cleaned and primed with a uniform application of asphaltic material as specified above. The priming material shall be applied with a self-propelled pressure distributor sprayer, except in places impossible to use a sprayer, at a rate of zero point fifteen (0.15) to zero point three (0.3) gallons per square yard of surface as determined by the Engineer. Subsequent application of pavement course shall not be laid until the primed surfaces have cured long enough to evaporate the volatiles. Alternate methods of application at the same coverage rates shall be used where the pressure distributor sprayer cannot be used.

- (2) Tack Coat: When required to obtain a satisfactory bond between courses or between the prime coat and surface course, a tack coat shall be applied prior to placing the next course. Tack coat material shall be as specified under "Materials" above. The course to which the tack coat is applied shall be swept clean before the tack is applied. The asphalt tack coat material shall be applied uniformly with a sprayer at a maximum coverage of zero point ten (0.10) gallons per square yard of surface as directed by the Engineer. The surface of curbs, gutters, vertical faces of existing pavements, and all structures in actual contact with asphalt mixes shall be painted with a thin, complete coating of asphaltic tack coat material to provide a closely bonded, water-tight joint.
- (3) Hot Mix Asphaltic Concrete construction methods shall conform to the requirements of Item 340 of the Texas Highway Department 1972 Standard Specifications for Construction of Highways, Streets and Bridges. Materials shall be as specified above under "Materials".

The compacted thickness or depth of the asphaltic concrete surface course shall be as shown on the plans or Standard Details. Where the plans require a depth or thickness of the surface course greater than two (2) inches, it shall be accomplished by constructed multiple courses of approximately equal depth.

All asphaltic concrete material shall be placed and rolled during daylight hours. The mixture shall be at a temperature between two-hundred twenty five (225) degrees F and three-hundred twenty five (325) degrees F when placed.

During the application of asphaltic material, care shall be taken to prevent splattering on adjacent pavement, curbs, gutters, and other structures.

- (a) Joints: The placing of the mixture shall be as continuous as possible, and the roller shall pass over the unprotected edge of the freshly laid mixture only when the laying is discontinued for such length of time as will permit chilling or cooling of the mixture. In every case when resuming the work, the material previously laid shall be cut back to produce a slightly beveled edge for the full depth of the course. The material cut away shall be removed from the site of the work. Fresh mixture shall be laid against the fresh cut. Construction joints shall be either parallel to or at right angles to the longitudinal axis of the work.
- (b) Compaction: The edges of the pavement along curbs, headers, manholes, valve boxes, and similar structures, and all places not accessible to the roller, or such areas where proper compaction cannot be obtained with the roller, shall be compacted with lightly oiled hand operated vibrating rollers, mechanical tamps, or hand tamped.

Each separate course after final compaction shall have a density of not less than ninety-five (95) percent of the density developed in the laboratory test method, ASTM D1188, "Test for Bulk Specific Gravity of Compacted Bituminous Mixtures, Using Paraffin-Coated Specimens".

- (c) Testing: The surface of the pavement, after final compaction, shall be

smooth and true to the established line, grade, and cross section, and shall have no deviation in excess of one eighth (1/8) inch per foot from the nearest point of contact when tested with a sixteen (16) foot straight-edge placed parallel to the centering of the roadway. The maximum ordinate measured from the face of the straight-edge shall not exceed one-quarter (1/4) inch at any point. All areas not complying with this requirement shall be corrected. When required by the City Engineer, the completed pavement shall be sampled and tested for thickness and density.

The testing agency will cut cores from the pavement at locations selected by the Engineer in order to determine if the specified thickness, stability, and density have been obtained. If any core indicates a deficient thickness, the Contractor may cut additional cores at his own expense in order to define the area of deficiency. The Contractor shall remove and repair the areas of deficient thickness, stability, or density, designated by the Engineer at no extra cost.

- B. Construction of Two Course Surface Treatment: Prime coat shall be required on all base course surfaces, as specified above for HMAC pavement, prior to construction of the two (2) course surface treatment. Materials shall be as specified above under "Materials". Construction methods shall conform to Item 322 of the Texas Highway Department Standard Specifications.
15. Curb and Gutter, Sidewalks, and Driveways: Construction of curb and gutter, concrete valleys, sidewalks, and driveway approaches shall conform to the following requirements. Concrete shall be Class B as specified under Item 2, "Concrete", of these Standard Specifications. No concrete shall be placed until the forms have been checked and approved by the City Inspector. Dimensions and conformation shall comply with the Standard Details appended to these specifications. Grades, alignment, and tolerances shall be as hereinbefore specified.

Forms shall be of wood or metal, of a section satisfactory to the Engineer, straight, free of warp and of a depth equal to the depth of the concrete face. They shall be securely staked to line and grade, and maintained in a true position during the depositing of concrete. Thin plywood, steel, or other similar material may be used to form short radius curb returns at driveways. The reinforcing steel, if required, shall be placed in position as shown on the typical sections. Care shall be exercised to keep all steel in its proper location.

- A. Curb and Gutter: The length of curb and gutter placed in any one day shall be limited to the amount which can be furnished in daylight hours. The concrete shall be of sufficiently dry consistency when placed to permit shaping of the curb without a face form. The concrete shall be spaded along the forms to eliminate honeycomb and the gutter section shall be consolidated by tamping. The top section of curb and gutter shall be formed by a template or "mule" fabricated to match the contour of the curb and gutter. The lip of the gutter shall be "turned down" where necessary to match the adjacent grade of valley gutters.

When the concrete has set sufficiently, the top surface shall be finished uniformly with a wood float, and then tooled transversely at five (5) foot intervals and longitudinally at the gutter lip and the back of the curb with a quarter (1/4) inch radius edging tool. Expansion joints with half (1/2) inch thick premolded expansion joint filler shall be installed at ends of curb returns, at cold joints between pours, and at other locations required by the Standard

Details or as directed by the City Engineer.

As an option to the method described above, the concrete may be struck off one-quarter (1/4) inch to half (1/2) inch low, and a mortar topping of the same sand-cement ratio placed to fill the curb and gutter section. Finishing shall then be accomplished as specified above with a full-section mule, wood float, and edging. Topping must be placed while the base concrete is still plastic and prior to initial set. The face of the curb shall be marked where water and sewer service lines cross under the curb with the letters "W" or "S", as appropriate, and as specified under Item 3, Water System, and Item 4, Sewer System, of these specifications. The letters shall be three (3) inches high and shall be imprinted while the concrete is sufficiently plastic to receive a legible impression.

Completed curb and gutter shall be coated immediately with a curing compound as specified under Item 2, "Concrete". Immediately following the removal of forms, the formed surfaces shall have all honeycomb neatly patched and the surface treated with curing compound.

Backfill shall not be placed against the curb face for at least five (5) days, and the backfill shall not be compacted in a manner that will cause lateral displacement of the curb. Care shall also be exercised to prevent scarring or defacing of the exposed surfaces with equipment used for backfilling and grading.

- B. Concrete Valleys shall be constructed in accordance with the Standard Details and to the grades indicated on the plans. Transitions to and from the standard curb and gutter sections at each end shall be such that water will not be trapped in the gutter section. The structure shall be monolithic with the curb and gutter at either end. Valleys shall have a wood float finish with transverse tooled joints as shown in the details. Steel reinforcement shall be provided as shown.
- C. Sidewalks and Drive Approaches shall conform to the Standard Details appended to these specifications. The subgrade shall be compacted uniformly to the approximate density of the surrounding undisturbed material, and a one (1) inch sand cushion provided on the subgrade. Wire mesh reinforcement shall be provided in both sidewalks and drive approaches. Wire mesh shall be 6 x 6 - 10 / 10 for sidewalks and 6 x 6 - 6 / 6 for driveways. Expansion joints shall be installed at the intersection of drives and walks, where cold joints occur, and where walks or drives abut other concrete structures. Walks and drives shall have a light brush finish as specified under Item 2 / Concrete of these specifications. The edges shall be tooled with a one-quarter (1/4) inch radius edging tool, and walks shall also be tooled transversely at five (5) foot intervals. This pattern shall be continued through the drive approach apron. Curing compound shall be applied to the surface immediately after finishing is completed.